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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/924,205	08/07/2001	Harlan A. Talley	10006809-2	1100

7590 03/07/2005

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EXAMINER	
HUNG, YUBIN	

ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 03/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/924,205	TALLEY ET AL.	
	Examiner	Art Unit	
	Yubin Hung	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amendments filed 08/30/04 and 01/18/05*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) *4,5,11,18 and 21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-10,12-17,19 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment/Arguments

1. This action is in response to amendments filed on 08/30/04 and 01/18/05.

2. Claims 4, 5, 11, 18 and 21 have been cancelled. Claims 1-3, 6-10, 12-17, 19 and 20 are still pending.

3. In view of applicant's amendment, the objection to the drawings has been withdrawn.

4. In view of the applicant's amendment, the 35 USC § 112 rejections have been withdrawn.

5. Applicant's arguments, filed 08/30/04, with respect to amended claims 1-3, 6-10, 12-17, 19 and 20 have been considered but are moot in view of the new ground(s) of rejection. See below.

Claim Rejections – 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugiura et al. (US 5,465,164) and Pan (US 6,587,590).

8. Regarding claim 1, and similarly claim 9, Sugiura discloses

- performing an inverse DCT upon data using processor executable instructions to generate a first result in a first color space [Fig. 1, numerals 116, 117; Col. 2, lines 56-62]
- performing a color space conversion to generate a second result using the first result having the second format [Fig. 1, numeral 117; Col. 2, lines 56-62]

Sugiura does not expressly disclose

- (the first result) having a first format including a sign bit, an integer portion, and a fraction portion
- converting the first result from the first format to a second format including an integer portion using conversion hardware

However, Pan teaches/suggests having the above-mentioned first format and converting the first format into a second format that includes an integer portion using conversion hardware. [Fig. 20, ref. 1730; Col. 57, lines 49-56. Note that the truncation operation converts a floating point (i.e., the first format, 16-bit long in this case) into the nearest integer, which is subsequently converted into a 9-bit integer (i.e., the second format). Further note that it is well known in the art that the floating-point format consists of a sign bit, an integer portion and a fraction portion]

Sugiura and Pan are combinable because they are from the same field of endeavor of compression/decompression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Sugiura with the teachings of Pan by using a first format that includes a sign bit, an integer portion and a fractional portion and a second format that includes integers. The motivation would have been to for the ease of implementation in hardware that typically has finite internal word length arithmetic as well as to achieve high precision (by using floating-point arithmetic, i.e., the first format).

Therefore, it would have been obvious to combine Pan with Sugiura to obtain the invention specified in claim 1.

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9. Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164) and Pan (US 6,587,590) as applied to claims 1 and 9 above, further in view of Greene (US 6,043,804).

10. Regarding claim 2, and similarly claim 10the combined invention of Sugiura and Pan discloses all limitations of its parent, claim 1.

The combined invention of Sugiura and Pan does not expressly disclose

- performing the color space conversion includes performing a matrix multiplication to generate the second result in a second color space from the first result in a first color space and having the first format

However, in [Fig. 3b, numeral 108; Fig. 4a; Col. 4, lines 31-54; Col. 5, lines 48-51] Greene teaches converting from one color space to another using matrix multiplication.

The combined invention of Sugiura and Pan is combinable with Greene because they both have aspects that are from the same field of endeavor of color processing.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Sugiura and Pan with the teachings of Greene by using matrix multiplication. The motivation would have been that the matrix defines the relationship between the two color space representations and lends itself to efficient implementation.

Therefore, it would have been obvious to combine Greene with Sugiura and Pan to obtain the invention specified in claim 2.

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11. Claims 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164), Pan (US 6,587,590) and Greene (US 6,043,804) as applied to claims 2 and 10 above, further in view of Winograd et al. ("Fast Algorithms for

the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193)

12. Regarding claim 3, and similarly claim 12, the combined invention of Sugiura, Pan and Greene discloses all limitations of its parent, claim 2.

The combined invention of Sugiura, Pan and Greene does not expressly disclose

- performing the inverse DCT includes using a Winograd process

However, in Sect. V (pp. 2185-2186) Winograd teaches the Winograd process.

The combined invention of Sugiura, Pan and Greene is combinable with Winograd because they both have aspects that are from the same field of endeavor of compression/decompression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Sugiura, Pan and Greene with the teachings of Winograd by using the Winograd process. The motivation would have been that the Winograd process is well known to be a fast algorithm for computing inverse DCT.

Therefore, it would have been obvious to combine Winograd with Sugiura, Pan and Greene to obtain the invention specified in claim 3.

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13. Claims 6, 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164), Pan (US 6,587,590), Greene (US 6,043,804) and Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193) as applied to claims 3 and 12 above, further in view of Bhaskaran et al. (US 5,467,131).

14. Regarding claim 6, and similarly claim 13, the combined invention of Sugiura, Pan, Greene and Winograd (SPGW) discloses all limitations of its parent, claim 3 and Greene further discloses

- the second format includes data elements each having 8 bits [Fig. 3b, the rightmost output. Note that B1/B2/B3 (i.e. R,G,B, which uses the second format) occupies 24 bits]

SPGW does not expressly disclose

- the first format includes data elements each having 16 bits

However, in Col. 8, lines19-22 Bhaskaran teaches using 16-bit arithmetic, which implies that the results of the operation (i.e., the elements such as Y, U and V that comprise each of the first results) have a format of 16 bits each.

SPGW and Bhaskaran are combinable because they both have aspects that are from the same field of endeavor of compression/decompression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify SPGW with the teachings of Bhaskaran by using 16 bits for each of the first plurality of data elements . The motivation would have been that the underlying hardware architecture could be taken advantage of to improve efficiency [Bhaskaran, Col. 8, lines 23-28].

Therefore, it would have been obvious to combine Bhaskaran with SPGW to obtain the invention specified in claim 6.

15. Regarding claim 7, the combined invention of Sugiura, Pan, Greene, Winograd and Bhaskaran [SPGWB] disclose all limitations of its parent, claim 6.

SPGWB does not expressly disclose

- the fractional portion of data elements includes 5 bits and the integer portion of data elements includes 8 bits

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify SGW by using 5 bits and 8 bits for the fractional and the integer portions, respectively, of the first plurality of data elements. Applicant has not disclosed that using the 5/8 breakdown provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with using a 6/7 breakdown

because in some situations (e.g., in a low-light environment) the, say, Y, U, V components may each have a value no more than 7-bit in size.

Therefore, it would have been obvious to one of ordinary skill in this art to modify SPGWB to obtain the invention as specified in claim 7.

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16. Claims 8, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (US 5,465,164), Pan (US 6,587,590), Greene (US 6,043,804), Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193), and Bhaskaran et al. (US 5,467,131) as applied to claims 6, 7 and 13 above, further in view of Karakawa (US 6,304,237).

Regarding claim 8, and similarly claims 14 and 15, the combined invention of Sugiura, Pan, Greene, Winograd and Bhaskaran (SPGWB) discloses all limitations of its parent, claim 7.

SPGWB does not expressly disclose

- the first color space includes a YCrCb color space and the second color space includes a RGB color space

However, in [Fig. 5; Col. 6, lines 18-23] Karakawa teaches having the first color space include an YCrCb color space and the second color space include a RGB color space.

SPGWB and Karakawa are combinable because they both have aspects that are from the same field of endeavor of color conversion.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify SPGWB with the teachings of Karakawa by using YCbCr as the input and RGB as the output color spaces, respectively. The motivation would have been that, with the increased popularity of digital HD TVs, YCbCr is also gaining importance since it is a digital color space for television transmission, .

Therefore, it would have been obvious to combine Karakawa with SPGWB to obtain the invention specified in claim 8.

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17. Claims 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 6,587,590), Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193) and Karakawa (US 6,304,237).

18. Regarding claim 16, and similarly claim 20, Pan discloses

- a processing device configured to execute instructions to compute an inverse DCT to generate decompressed YCrCb color space data in a first format including a sign bit, an integer portion, and a fractional portion
  [Fig. 5, numeral 540; Col. 5, lines 55-67; Col. 6, lines 15-21. For the first format (per the analysis of claim 1): Fig. 20, ref. 1730; Col. 57, lines 49-56]
- a converter configured to change the YCrCb color space data from the first format to a second format including an integer portion
  [Fig. 20, numeral 1730; Col. 42, lines 14-17; Col. 58, lines 44-47. For the second format (per the analysis of claim 1): Fig. 20, ref. 1730; Col. 57, lines 49-56]

Pan does not expressly disclose

- that the IDCT is computed using a Winograd process
- a color space converter configured to generate RGB color space data from the YCrCb color space data in the second format

However, in Sect. V (pp. 2185-2186) Winograd teaches using the Winograd process for IDCT and in [Fig. 5; Col. 6, lines 18-23] Karakawa teaches converting (format-converted) YCbCr color space data into RGB color space data.

Pan, Winograd and Karakawa are combinable because they both have aspects that are from the same field of endeavor of data conversion.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Pan with the teachings of Winograd and Karakawa by using the Winograd process for the IDCT computation and to convert YCbCr color space data into RGB color space data. The motivation would have been that the Winograd process is well

known to be a fast algorithm for computing inverse DCT and that RGB is the most widely used color space for CRT displays.

Therefore, it would have been obvious to combine Winograd and Karakawa with Pan to obtain the invention specified in claim 16.

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19. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (US 6,587,590), Winograd et al. ("Fast Algorithms for the Discrete Cosine Transform," *IEEE T. Signal Processing, V. 40, No. 9*, Sep. 1992, pp. 2174-2193) and Karakawa (US 6,304,237), as applied to claims 16 and 20 above, further in view of Bhaskaran et al. (US 5,467,131) and Greene (US 6,043,804).

20. Regarding claim 17, the combined invention of Pan, Winograd and Karakawa (PWK) does not expressly disclose

- the YCrCb color space data in the first format includes a first set of data elements each having 16 bits and the YCrCb color space data in the second format includes a second set of data elements each having 8 bits

However, in Col. 8, lines19-22 Bhaskaran teaches using 16-bit arithmetic, which implies that the results of the operation (i.e., the elements such as Y, U and V that comprise each of the first results) have a format of 16 bits each. Furthermore, Greene teaches

using 8 bits for each data element. [Fig. 3b, the rightmost output. Note that B1/B2/B3 (i.e. R,G,B, which uses the second format) occupies 24 bits]

PWK, Greene and Bhaskaran are combinable because they both have aspects that are from the same field of endeavor of compression/decompression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify PWK with the teachings of Greene and Bhaskaran by using 16 bits and 8 bits for the first and the second data formats, respectively . The motivation would have been that the underlying hardware architecture could be taken advantage of to improve efficiency [Bhaskaran, Col. 8, lines 23-28] as well as to be able to display at monitors that have lower color resolution (i.e., to support a much wider range of color displays).

Therefore, it would have been obvious to combine Greene and Bhaskaran with PWK to obtain the invention specified in claim 17.

21. Regarding claim 19, Greene further discloses

- the color space converter includes a configuration to generate RGB color space data from the YCrCb color space data in the second format using a matrix multiplication
  [Fig. 3b, numeral 108; Fig. 4a; Col. 4, lines 31-54; Col. 5, lines 48-51]

Conclusion and Contact Information

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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March 3, 2005